Remarks

Applicant has read and considered the Office Action dated April 7, 2005 and the references cited therein. Claims 1-5 are now pending in this application. Editorial revisions have been made to claims 1-5 to place them into proper United States format and to correct formal matters. Applicant respectfully requests reconsideration and allowance of claims 1-5 in view of the following comments.

Objections to the Specification

Applicant notes that the Examiner checked the box on the first page of the Office Action objecting to the specification. However, no discussion of the specification or the objection is found within the Office Action. Consequently, Applicant has assumed for the purposes of this response that the box was checked in error. The Examiner is invited to call the Applicant's Representative at the below listed telephone number with any questions or comments he may have regarding the present application.

Section 112 Rejections

Claims 1 and 5 have been rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Action stated that the meaning and function of the term key word was confusing. Applicant has considered the Examiner's comments and made appropriate correction. In particular, claim 1 has been amended to recite, in part, using the image block average value of the image block to be coded as a key word for the associative memory device. Therefore, the average value is used as a key word (*i.e.* or search term) when searching the memory device. Applicant asserts that claim 1 is supported by the specification. No new matter has been added. Withdrawal of the rejection is respectfully requested.

Art Rejections

Claims 1-5 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Jung (US 6,061,401, hereinafter "Jung") in view of Parulski *et al.* (US 5,633,678, hereinafter "Parulski"). Applicant respectfully traverses this rejection.

Claim 1, as amended, recites, in part, a method for performing motion estimation of image blocks on image frames in video image compression using an associative memory device including a directory memory having memory locations and an output memory including a plurality of memory locations. Each of the plurality of memory locations of the output memory corresponds to at least one memory location of the directory memory. The method includes sorting a plurality of image blocks included in a search area by storing the image block average values of the plurality of image blocks in the memory locations of the directory memory of the associative memory device. The method further includes storing in the memory location of the output memory corresponding to each memory location of the directory memory the location of the image block having an image block average value corresponding to the image block average value stored in the memory location of the directory memory. The method still further includes searching among the plurality of image blocks for an image block best matching an image block to be coded using the image block average value of the image block to be coded as a key word for the associative memory device.

As noted in the application, the search phase of motion estimation is complex and time consuming. Expensive, special hardware, such as signal processing circuits, is sometimes required to search within a reasonable time. The use of the associative memory device enables faster searching for a matching memory block. By first sorting and storing the locations of the image blocks, later searches can be conducted more quickly using the average value as a key word. As used in this application, the term "key word" is not a memory file name, but is a search term used when searching the associative memory device. In other words, when an image block average value is input into an associative memory device, the associative memory device outputs the location of the image block having that average value.

Jung fails to disclose or suggest using an associative memory device to perform motion estimation. In particular, Jung does not disclose or suggest storing the image block average values of the plurality of image blocks in the memory locations of the directory memory of the associative memory device. While Jung does disclose an error signal memory (Fig. 2, reference no. 210), Jung fails to disclose or suggest using the error signal memory for sorting the mean values in any particular order.

Furthermore, no suggestion is made in Jung that the error signal memory is an associative memory. Even if the mean values calculated for the error blocks included in the error signal received by the decoder in Jung could be considered equal to the image blocks recited in claim 1, a point Applicant does not concede, Jung still fails to disclose or suggest storing these mean values to any memory device in order to sort them. Rather, Jung merely discloses utilizing the mean values for selecting which error blocks are to be processed further. For example, one may select four error blocks with the largest mean values. Jung, column 6, lines 33-53. However, the selection process is performed using conventional algorithms and does not include storing values in an associative memory device.

Jung further fails to disclose or suggest searching for an image block using the partial distance elimination method. Rather, Jung discloses using displacement to find a best match. The displacement method relates to spatial displacement between blocks in subsequent frames (*i.e.*, motion vectors). In contrast, the partial distance elimination method utilizes the magnitude of an error computed between an image block to be coded and a candidate image block to determine whether to continue computing the error or whether to exit early and start processing the next candidate image block. *See e.g.* page 6, lines 15-25.

Parulski does not overcome the shortcomings of Jung. Parulski fails to disclose or suggest using an associative memory device to perform motion estimation. Parulski further fails to disclose or suggest using an image block average value as a key word for an associative memory device. Furthermore, no motivation is found in Parulski to search for a best match using the partial distance elimination method. For at least these reasons, Jung would not lead a person

having skill in the art to the invention of claim 1, even in view of Parulski. Claims 2-4 depend from claim 1 and are allowable for at least the same reasons. Applicant does not otherwise concede the correctness of the rejection and reserves the right to make additional arguments if necessary.

Claim 5, as amended, recites, in part, a system for performing motion estimation of image blocks from a first image frame to a second image frame. The system includes an associative memory device for sorting the image blocks included in the search area. The associative memory device includes a directory memory and an output memory. The directory memory stores image block average values of the image blocks included in the search area. The output memory stores the locations of the image blocks. The image block average value of the image block to be coded is used as a key word for the associative memory device. Therefore, Applicant respectfully submits that claim 5 is allowable over the combination of Jung and Parulski for at least the same reasons as discussed above with respect to claim 1. Applicant does not otherwise concede the correctness of the rejection and reserves the right to make additional arguments if necessary.

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner feels that a telephone interview may be helpful in this matter, please contact Applicant's representative at 612.336.4728.

Respectfully submitted,

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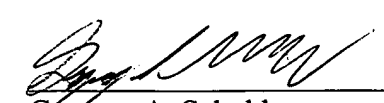

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